**Intelligent System: Project 2**

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**Hill Climbing Algorithm:**

Hill Climbing is a heuristic search algorithm used to solve certain optimization problems provided a large set of inputs and an admissible heuristic function, it tries to find a sufficiently good solution to the problem.

**Types of Hill climbing**

**Simple Hill climbing:**It examines the neighboring nodes one by one and selects the first neighboring node which optimizes the current cost as the next node.

**Steepest-Ascent Hill climbing:**It first examines all the neighboring nodes and then selects the node closest to the solution state as the next node.

**Stochastic hill climbing**: It just selects a neighboring node at random and decides whether to move to that neighbor or to examine another. It does not examine all the neighboring nodes before deciding which node to select.

**Challenges faced by hill climbing**

**Local Maxima**: A state which is better than its neighboring state however there exists a state which is better i.e. global maximum.

Random-restart hill climbing overcomes local maxima. It conducts a series of hill-climbing searches from randomly generated initial states until a goal is found.

**Plateau/Shoulders**: Plateau is where the best successor has the same value as the current state.

Hill climbing with sideways moves escape from plateau hoping that the plateau is really a shoulder, however, can loop on flat maxima so a limit must be applied.

**What is N queen problem?**

The n-queens problem, originally introduced in 1850 by Carl Gauss, may be stated as follows: find a placement of n queens on an NxN chessboard, such that no one queen can be taken by any other.

The heuristic cost function *h* is the number of pairs of queens that are attacking each other, either directly or indirectly.

**Application of Hill Climbing to solve N queen problem:**

**Steepest Hill Climbing**

**Hill climbing with Side-ways Move**

**Random restart search**